From: Riccardo Poli [R.Poli@cs.bham.ac.uk]
Sent: Friday, January 15, 1999 6:44 AM
To: koza@SMI.Stanford.EDU
Cc: nordin@fy.chalmers.se
Subject: eurogp99 review results

Dear Author,

Thank you very much for submitting a paper to the Second European
Workshop on Genetic Programming (EuroGP'99).

Based upon the reviewers' comments, we are very pleased to inform you
that your paper has been accepted for ORAL presentation at the
workshop and publication in the proceedings.

In order to achieve the highest quality proceedings, we ask you to
carefully consider the reviewers' comments appended to this message
when preparing the final version of your contribution. Instructions on
how to format the camera ready version of your paper are available
from

   http://www.springer.de/comp/lncs/authors.html

where you will find instructions and style files for LaTeX users and
for Word users. Instructions on how to send us the electronic version
of your paper will be circulated next week.

Please, note that the maximum length allowed for the camera ready
version of your paper is 16 pages (everything included).

Also, we would like to remind you that the deadline for sending the
camera ready manuscript is 15 FEBRUARY 1999 and that this is a firm
deadline.

Please forward this message to your co-authors (if any).

Looking forward to seeing you in Goteborg.

Best regards,

Riccardo Poli and Peter Nordin
EuroGP'99 Programme Co-chairs

===================== REVIEWS START HERE ==========================

EUROGP'99 PAPER REVIEW FORM

Please return this form by email to:

R.Poli@cs.bham.ac.uk AND nordin@fy.chalmers.se

by Monday 11th January 1999

   REVIEWER NUMBER: 10
   TITLE: Genetic Programming as a Darwininan Invention Machine
   AUTHOR(S): Koza, Bennett and Stiffelman

REVIEWER'S STATEMENT:
- I have read this paper.

- I am not at the same institution as any of the authors.
- I am not reviewing more than one paper for this conference by this author.
- I do not have an especially close relationship (or an antagonistic relationship) with the author(s).
- I am not re-reviewing this work (i.e., I have not, within the past year, reviewed substantially the same work by the same author).
- This review is my own opinion and work and has not been delegated to anyone (specifically including students or subordinates).
- I have not discussed my review of this paper with any other peer reviewer for this conference.
- I will regard any new intellectual content of this paper as confidential and will not disclose or use it until such time as it gets published under the author's name or otherwise becomes publicly known (and, if I discussed this review with anyone else at all, they have also explicitly agreed to maintain the author's work as confidential and I notified the program chairs of their agreement to do so).
- I feel that I am qualified to review this paper.

XX Yes (indicates a "yes" to all of the above items for this particular paper)
__ No


```
                              GOOD            OK            BAD
                              9  8  7  6  5  4  3  2  1  0
ORIGINALITY              :                    3
SIGNIFICANCE OF PROBLEM  :                    3
TECHNICAL SOUNDNESS      : 9
CLARITY AND ORGANISATION :    8
RELEVANCE TO CONFERENCE  :          6
```

YOUR RECOMMENDATION: (delete all but one of these)
        o definitely accept as poster

REVIEWER'S CONFIDENCE:
                    o high

AMOUNT OF REVISION NEEDED:

                    o none

FORMAT: Does the paper conform fully with the EuroGP'99 proceedings
        length (12 pages, 15 max) and format (Springer Verlag's
        Lecture Notes in Computer Science, see the example at
        http://www.cs.bham.ac.uk/~rmp/eebic/llncs_example.ps)?

        Please delete as necessary.

        o The paper is NOT fully compliant for the following reasons:

            - The printing area is NOT 12.2cm x 19.3cm (4.8 x 7.6 inches)
            - The font is NOT Computer Modern 10pt (looks smaller)

        Other problems (please specify):

This paper probably would be too long if formatted with the required page size.

   ENGLISH: Please delete as necessary.

            o The English is fine.
Additional comments:

COMMENTS FOR AUTHOR(S):

The paper describes the use of GP with an ontogenic representation to design an analog lowpass filter circuit. It describes how to use subgraph isomorphism penalties to lead evolution toward novel solutions.

It is ironic that so much of this paper seems to be derived heavily from earlier papers. I hope the author didn't include large sections of their earlier papers verbatim, but didn't check. It is ironic that a paper on innovation would have so much familiar verbiage in it.

Some of this isn't needed. For example, this is at least the third paper from these authors where I've seen the two paragraph quotation from Aaserud and Nielson to the effect that "designing analog circuits is hard". Since that isn't even the point here, perhaps it would suffice just to SAY "designing analog circuits is hard" and cite Asserud and Nielsen. Much of chapter 2 seems unnecessary, in fact, and a simple reference to earlier work should suffice.

One part of the paper was literally unreadable: the text above Figure 1 was masked out by the figure, somehow.

The discussion of patent law was very helpful and interesting.

The main contribution of the paper was a technique for penalizing evolved solutions if they were too similar to known solutions. Specifically, to drive the solutions away from a ladder architecture, individuals were penalized for being isomorphic to subgraphs of a large ladder of capacitors.

But this is in actuality little more than old-fashioned fitness sharing, where the designs to be avoided are seeded into the population. The main claim of the paper then reduces to this: fitness sharing creates diversity. That is hardly a new result. This is why I ranked the significance and originality rather low.

This technique also is unlikely to generalize. For example, a T structured circuit cannot be artificially enlarged, as the authors enlarged their ladder. Consequently, searching for subgraphs that are isomorphic to an evolved circuit cannot be done for T structured circuits. In fact, it is difficult to see how this subgraph isomorphism checking approach can work for any type of prior art other than those with repetitive simple units in a simple structure, where further repetition only fine tunes the circuit. Given this criticism, the authors are claiming more for this approach than is warranted.

The title is also too grandiose. This is more a paper about using GP to find solutions with a small, highly restricted set of solutions to avoid, than a paper demonstrating a "Darwinian Invention Machine". Perhaps a better title would be "GP to find Patentable Circuits"?

Nonetheless, the paper is well written. The use of GP to design analog circuits really is significant, because the problem really is hard (though lowpass filters are pretty well solved already). The idea of directing evolutionary innovation, even if the only real direction is "not here", is a good one. This work should be presented.

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EUROGP'99 PAPER REVIEW FORM

Please return this form by email to:

by Monday 11th January 1999

REVIEWER NUMBER: 2

TITLE: Genetic Programming as a Darwinian Invention Machine

AUTHOR(S): Koza

REVIEWER'S STATEMENT:

- I have read this paper.

- I am not at the same institution as any of the authors.

- I am not reviewing more than one paper for this conference by this author.

- I do not have an especially close relationship (or an antagonistic

  relationship) with the author(s).

- I am not re-reviewing this work (i.e., I have not, within the past year,

  reviewed substantially the same work by the same author).

- This review is my own opinion and work and has not been delegated to

  anyone (specifically including students or subordinates).

- I have not discussed my review of this paper with any other peer reviewer

  for this conference.

- I will regard any new intellectual content of this paper as confidential

  and will not disclose or use it until such time as it gets published under

  the author's name or otherwise becomes publicly known (and, if I discussed

  this review with anyone else at all, they have also explicitly agreed to

  maintain the author's work as confidential and I notified the program chair

 s

  of their agreement to do so).

- I feel that I am qualified to review this paper.

Y_ Yes (indicates a "yes" to all of the above items for this particular paper

)

	GOOD				OK				BAD	
	9	8	7	6	5	4	3	2	1	0
ORIGINALITY	: 9									
SIGNIFICANCE OF PROBLEM	: 9									
TECHNICAL SOUNDNESS	: 9									
CLARITY AND ORGANISATION	: 8									
RELEVANCE TO CONFERENCE	: 9									

YOUR RECOMMENDATION: (delete all but one of these)

                     o definitely accept as paper (talk)

REVIEWER'S CONFIDENCE:

                     o high

AMOUNT OF REVISION NEEDED:

                     o moderate

FORMAT: Does the paper conform fully with the EuroGP'99 proceedings
       length (12 pages, 15 max) and format (Springer Verlag's
       Lecture Notes in Computer Science, see the example at
       http://www.cs.bham.ac.uk/~rmp/eebic/llncs_example.ps)?

       Please delete as necessary.

       o The paper is NOT fully compliant for the following reasons:

         - The printing area is NOT 12.2cm x 19.3cm (4.8 x 7.6 inches)
       Other problems (please specify):
Not using LNCS standard at all. Eg rules for referring to Fig., Sect.,

ENGLISH: Please delete as necessary.

          o The English is fine.

      Additional comments:

    COMMENTS FOR AUTHOR(S):

A important aspect of this paper is the use of a similarity measure to
discourage GP from finding solutions similar to existing
ones. Perhaps this should be made more explicit in the title?

A possibility for future work would be to include dissimilarity
measures within the fitness measure rewarding members of the
population that are different from others in the same population.
Thus the dissimilarity could itself be evolved.

Co-evolutionary and multi-objective (possibly with fitness sharing)
approaches come to mind.

p3 sec 3 para 3
        formatting problems with text immediately above figure 1.

p5 sec 4.5 para 3
        Equation F(t) has ugly fonts

p6 top text
        How does algorithm scale with graph size?

p6 end 1st para
        Ref to Koza 1995; looks wrong

p6 4.8 bot
        Say more explicitly how the 600 where chosen.
        Eg are they the best 600?
        Say (presumably) 4 copies of each sent. (Do you cite why you use 2%)
        Presumably each node runs asynchronous, any way include in paper.

p7 fig4
        May be give each a separate number. ie Figs 4 5 and 6
        Some thing messed up with caption on 4b.

p7 sec 5 2nd para 2nd sentence
        I think "very little" is over stating it.
        Fig 4a shows firstly that it _is_ a low bandpass filter
        and secondly its cut off (50%) is close(ish) to the desired point.

p9 2nd para
        is spelling of Geottingen right?

p9 sec 6
        mention runtime (may be also comparison of cost of genius v
        cost of hardware?)

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EUROGP'99 PAPER REVIEW FORM

Please return this form by email to:

R.Poli@cs.bham.ac.uk AND nordin@fy.chalmers.se

by Monday 11th January 1999

   REVIEWER NUMBER: 8
   TITLE: Genetic Programming as a Darwinian Invention Machine
   AUTHOR(S): John R. Koza, Forrest H Bennet III, Oscar Stiffelman

REVIEWER'S STATEMENT:
- I have read this paper.
- I am not at the same institution as any of the authors.
- I am not reviewing more than one paper for this conference by this
author.
- I do not have an especially close relationship (or an antagonistic
  relationship) with the author(s).
- I am not re-reviewing this work (i.e., I have not, within the past
year,
  reviewed substantially the same work by the same author).
- This review is my own opinion and work and has not been delegated to
  anyone (specifically including students or subordinates).
- I have not discussed my review of this paper with any other peer
reviewer
  for this conference.
- I will regard any new intellectual content of this paper as
confidential
  and will not disclose or use it until such time as it gets published
under
  the author's name or otherwise becomes publicly known (and, if I
discussed
  this review with anyone else at all, they have also explicitly agreed
to
  maintain the author's work as confidential and I notified the program
chairs
  of their agreement to do so).
- I feel that I am qualified to review this paper.

X_ Yes (indicates a "yes" to all of the above items for this particular
paper)

                                  GOOD   OK   BAD
                                  9 8 7 6 5 4 3 2 1 0
   ORIGINALITY   :   8
   SIGNIFICANCE OF PROBLEM :   6
   TECHNICAL SOUNDNESS   :   6
   CLARITY AND ORGANISATION :   5
   RELEVANCE TO CONFERENCE :   8

   YOUR RECOMMENDATION: (delete all but one of these)
                        o definitely accept as paper (talk)

   REVIEWER'S CONFIDENCE:
                        o medium

   AMOUNT OF REVISION NEEDED:
                        o little

FORMAT: Does the paper conform fully with the EuroGP'99 proceedings
        length (12 pages, 15 max) and format (Springer Verlag's
        Lecture Notes in Computer Science, see the example at
        http://www.cs.bham.ac.uk/~rmp/eebic/llncs_example.ps)?

        Please delete as necessary.

        o The paper is NOT fully compliant for the following reasons:

            - The printing area is NOT 12.2cm x 19.3cm (4.8 x 7.6
inches)
            - The paper is NOT (fully) single column
            - Title, authors and abstract ARE in a separate page

        Other problems (please specify):
            - Above figures 1 and 2 a part of the preceeding text
              is deleted. There seem to be some trouble with the
              figure placement.
    - The references should be numbered.

ENGLISH: Please delete as necessary.

        o The English is fine.

        Additional comments:

COMMENTS FOR AUTHOR(S):

Main points:
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The idea of automatically creating analog cirtcuits by GP is
very fascinating. However I do not see a great motivation
in avoiding existing key characteristics. Much more important
to me seems to be for example
 - the size of the circuit (number of C and L)
 - the power consumption

In fact, in the end of section 5 you say "This reduction [of one
component] was very important in the days when filters in
telephones were manufactured by individually soldering in expensive
discrete components". So why don't you use GP to evolve a circuit
that meets the required frequency behavior with a minimum nuber
of components?

 - You don't say in which generation the eight circuits of table 1
   occured. Or did you run the GP for all 501 generations? (This
   would mean that you tried about one billion circuits!)
 - In table 1 row 5 there seems to be a typo as the overall fitness
   is the same as the frequency response factor.

Minor points:
=============
 - The equation in section 4.5 looks quite unreadable. Why
   do you use such an enlarged font?
 - What is the meaning of the variable $ in the same formula?
 - Figure 3 is not numbered and has no caption.
 - The better citation for Gruau 1992 (technical report) is his
   Phd: "Neural Network Synthesis using Cellular Encoding and
   the Genetic Algorithm". University of Grenoble, France, 1994

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